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ABSTRACT

This exploratory study examined a field-based project in which preservice teacher candidates and faculty collaborated to implement a problem-centered, technology integrated curriculum for a multiage (4th, 5th, and 6th grade) intersession at Timber Lane Elementary School. Content included detective skills such as fingerprinting and handwriting analysis, advertisements, and literature-based mystery stories. Educational goals focused on developing problem-solving skills, literacy abilities, and working as a community. Activities included solving mysteries, analyzing clues, writing mystery stories, creating advertisements, and investigating crimes. Tools used throughout the two-week curriculum included paper and pencil assignments, word processors, video, simulations, books, print graphic programs, computer-based interactive fiction, and databases. Preservice candidates' reflections on their experience were compared with reflections of candidates who completed a less structured field experience regarding what they learned about themselves, teaching, young learners and the learning/thinking process, and technology in educational settings. The reflections of those who participated in the technology-integrated project suggest that their experiences in actively using technology as a part of the teaching/learning process assisted them in developing an image of how technology can be used and provided them with a vision of how their coursework (theory) can translate to the design of learning opportunities (practice). (AEF)

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Timber Lane Tales: Problem-Centered Learning and Technology Integration

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Abstract: Technology integration was probably never part of faculty learning experiences and often not part of their own elementary teaching experiences. Except in occasional and haphazard ways, technology integration was not part of preservice candidates' experience as a learner any more than it was part of faculty's experiences. Yet, teacher education promotes technology integration in the teaching/learning process is an important educational goal. This exploratory study examines a field-based project where faculty and preservice candidates collaborated to implement a problem-centered, technology integrated curriculum. Preservice candidates' reflections on their experience are compared with the reflections of preservice candidates who completed a less structured field experience.

Introduction

The art in teacher education depends on the complex interplay of theory and practice and finds its most important expression in the bridge between the two. If aliens were to visit Earth to study this art, they might well be perplexed by the many seemingly contradictory relations between faculty, preservice candidates, and elementary students. Although the object of a faculty's interest might be the learning of elementary students, their students are actually preservice candidates not elementary children. Faculty's relationship to the elementary classroom is generally dependent on their memory of their own practice or on their observations of others practicing in that environment. Learners in elementary classrooms are not faculty's students but the students or perspective students of their students. Faculty teach in university classrooms not elementary classrooms. Faculty design curriculum for perspective teachers not for elementary children. Technology integration was probably never part of faculty learning experiences and often not part of their own elementary teaching experiences. Rather, it is an innovation about which they teach, research, write, and debate.

For the preservice candidate, their role is not as teacher but as student. Their role in university classrooms is to learn about teaching; their role in schools prior to actual student teaching is to observe teaching. The elementary curriculum is something someone else has planned. Teaching is their goal not something they do. Except in occasional and haphazard ways, technology integration was not part of preservice candidates' experience as a learner any more than it was part of faculty's experience. Preservice teachers hear about technology integration. They are told how it might be done. When they are sent to schools to observe others teaching, they often see little technology use and only rarely see technology used as an integrated part of the ongoing instructional program.

The contradictory roles and relationships of faculty and preservice candidates make the bridge between theory and practice ever more problematic as "state-of-the-art" knowledge about technology integration among educational theorists moves farther and farther from most observable educational practice. How would preservice candidates' understanding of technology integration be different if faculty were to design and implement curriculum for elementary students that modeled educational practices taught during courses? How would preservice candidates' understanding of technology integration be different if what faculty and preservice candidates shared was not a university classroom but an elementary classroom?

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How would preservice candidates' understanding of technology integration be different if conceptions of technology integration became realities not abstractions? The opportunity to explore these questions presented itself when the principal at Timber Lane Elementary School called.

Timber Lane Tales

Timber Lane Elementary is a small school nestled in a large metropolitan area. With a high yet stable population of low socio-economic and minority students, teachers and administrators at the school worked for two years to find instructional alternatives that would meet the unique and challenging needs of this population. Their research led them to year round schooling. After surveying the community and making appropriate arrangements with district personnel, Timber Lane Elementary School began a year round program in late summer, 1998. Part of the program was to implement innovative two-week instructional intersessions during the three-week breaks between formal instructional periods. The faculty contacted a broad range of community resources, seeking volunteers to develop and conduct non-traditional learning modules during these times.

Among those who responded to the call for innovative modules, the authors – both university professors - offered to participate. What might instruction for upper elementary students look like if it integrated technology throughout the learning process? How would young students respond to that instruction? Norton and Wiburg (1998) state that the design of instruction that integrates technology lies at the intersection of thoughtful decisions about educational goals, content, activities, and tools. Educational goals include instruction that seeks to promote literacy, problem-solving, knowledge, information use, and community. Content includes the events, concepts, and examples that reflect disciplinary knowledge and are defined by professional and state standards. Activities include those that are problem-centered, project-based, authentic, constructivist, and cooperative. Tools such as the Internet, word processors, hypermedia, and simulations should be selected to support goals, contents, and activities. Thus, a range of technologies become an integral part of the instructional design not an object of instruction. Using this model of technology integration suggested designing problem-centered units for each of the intersessions as opposed to offering workshops on hypermedia or the Internet.

A multiage (4th, 5th, and 6th grade) problem-centered, technology integrated intersession was planned and implemented. During the October intersession, elementary students were challenged to join the Timber Lane Detective Agency and refine their detecting skills such as fingerprinting, handwriting analysis, code breaking, and mystery solving. The intersession activities culminated in children's earning the badge of a "Master Detective" which authorized them to identify and arrest school personnel accused of committing offenses.

The authors designed the curriculum and instructional materials in the weeks prior to the intersession using the framework developed by Norton and Wiburg (1998). Content selected included detective skills such as fingerprinting and handwriting analysis, advertisements, and literature-based mystery stories. Educational goals focused on developing problem-solving skills, literacy abilities, and working as a community. Activities included solving mysteries, analyzing clues, writing mystery stories, creating advertisements, and investigating crimes. Tools used throughout the two-week curriculum included paper and pencil assignments, word processors, video, simulations, books, print graphic programs, computer-based interactive fiction, and databases. At the intersection of these four considerations was the design for the Timber Lane Detective Agency curriculum and the unifying central problem - can you learn to solve mysteries well enough to earn the privilege of making an arrest.

In preparation for the intersession, student handbooks were designed and desktop published on advertising a detective agency, fingerprinting, code breaking, and handwriting analysis. The handbook on advertising a detective agency asked children to analyze ads for detective agencies taken from the phone book. Their attention was drawn to selection of a name and logo for the agency, descriptions of the services provided by a detective agency, and communication of information about agents and contact information. Once students had completed the handbook, they were divided into groups of six and asked to form a detective agency and use *PrintShop Deluxe* to create an advertisement and banner for their agency. The handbooks on fingerprinting, code breaking, and handwriting analysis were interactive. Agencies collaborated on completing the learning activities associated with the handbooks. When a handbook was completed (usually over several days), the agency was given mysteries to solve that required them to use the information learned from completing the handbook.

Another component of the Timber Lane Detective Agency curriculum was the selection of two *Shelby Wu* mystery videos that students watched and solved. A word processor and *PrintShop Deluxe* were used for publications. Students also played with *Where in the USA is Carmen San Diego* (Broderbund), *Wishbringer* (Infocomm), and *Sherlock Holmes Consulting Detective* (ICON Simulation), solving the mysteries presented by these software packages. Six *Encyclopedia Brown* mysteries were selected. Worksheets were created to assist agencies to solve the mysteries. Each time students were successful at solving one of the mysteries, they earned a promotion and a new badge.

A database and a file containing digitized pictures of school personnel were created. Practice mysteries were written which required students to use the database. When students in each agency had earned a "Master Detective" badge, the agency was given a special crime to solve using the database. They then made Wanted Posters and arrest warrants using *PrintShop Deluxe*. Each agency planned and wrote a mystery. When the agency made an arrest on the last day of the intersession, the "criminal" was given the opportunity to solve the mystery written by the students to avoid being sent to jail.

Each morning when students arrived, the agencies' case assignments for the day (approximately one hour for each of three activities) were written on the board. For each case assignment, the agency was assisted in completing their assignments by one of the authors or one of the six university preservice candidates who joined the authors to teach the intersession. The preservice candidates and authors rotated among the agencies, switching groups as each new assignment began. The preservice candidates and authors had multiple opportunities to work with each agency and to teach each of the different activities. Informal conversations occurred frequently about the needs of particular students, about strategies for working with children, about the goals and activities associated with each case assignment, and the curriculum as a whole.

The Timber Lane Tales project was intended as a learning experience for educators across the developmental spectrum. For university professors, the two-week intersession format offered the opportunity to enter elementary classrooms and teach both young students and preservice candidates within a structure that could be adapted to other university commitments. It offered a "living laboratory." For preservice teachers, participating in Timber Lane Tales provided the opportunity to actively teach and observe curriculum and instruction that brought to life their studies about educational practice and offered a vision of technology integration.

Studying the Timber Lane Experience

All preservice candidates attending the Graduate School of Education at George Mason University must complete a three credit hour course focusing on educational technology. Sections of this course are tailored to the grade levels associated with the license they are seeking. Students who enroll in this course must complete a 15 clock hour field experience as part of the course requirements. A placement specialist is responsible for assigning students to a school and providing a contact person. Preservice candidates are responsible for contacting that person and arranging times to complete the field experience requirements. During their field experience time, students are asked to observe classrooms, teachers, and students who are using technology.

In preparation for the Timber Lane Tales intersession, the authors visited each of the sections of the educational technology course. The project was described, and students were offered the opportunity to substitute participation in the project for the more open-ended field experience. Since the total time commitment for the intersessions exceeded the field experience requirements by 12 hours, the software review requirement was also waived. Many of the students enrolled in the educational technology sections are employed during the day, and the extensive commitment associated with the project (from 9:00 AM to 12 PM, daily for two weeks) was not feasible. However, two men and four women volunteered. One week prior to the beginning of the intersession the preservice candidates and faculty met for a three hour period. The curriculum was described, and instructional materials were reviewed. Roles and responsibilities were discussed. All questions were answered.

At the completion of the project, preservice candidates' were asked to write their reflections to four questions: 1.) What did you learn about yourself during your two weeks at Timber Lane? 2.) What did you learn about teaching during your two weeks at Timber Lane? 3.) What did you learn about the learning/thinking process and about young learners during your two weeks at Timber Lane? And 4.) What did you learn about technology in educational settings during your two weeks at Timber Lane? To

compare the impact of the experiences of the preservice candidates who participated in the Timber Lane Tales project with the experiences of their fellow classmates who completed the field experience, six classmates were randomly selected and asked to provide the authors with their reflections to four questions. The questions included 1.) What did you learn about yourself during your field experience? 2.) What did you learn about teaching during your field experience? 3.) What did you learn about the learning/thinking process and about young learners during your field experience? And 4.) What did you learn about technology in educational settings during your field experience?

Learning about Themselves: The following represents an overview of responses with representative samples of comments. In response to the first question – what did you learn about yourself, preservice candidates who complete the field experience had little to say. One candidate simply wrote "nothing new." Another preservice candidate wrote, "What I learned about myself from these classroom visits is the value I put in personal strength, by this I mean character and personality, as the overriding determiner of success in a classroom. I did have opportunities to watch as teachers showed off their fancy equipment and skills. The success of the lesson seemed more dictated by how the class was run." A third preservice candidate stated: "I learned that I should adapt well to technology use . . . I am well organized and analytical in my approach to developing materials. I observed that these are prerequisite aptitudes for teachers that want to integrate technology into their traditional lessons."

In marked contrast, the preservice candidates that participated in the Timber Lane Tales project expressed many things they felt they had learned about themselves. Several of them talked about learning about patience. One preservice candidate discovered they were more patient than they thought while another stated they needed to learn to be more patient. Several students reported learning that they did not always have to be the expert. One preservice candidate wrote, "The most important thing I learned is that it is O.K. to not be an expert. Although I don't know much about computers, I found myself experimenting more. The kids did not seem to mind that I did not know everything." Another wrote: "Reflecting on my experience with the kids at Timber Lane, I learned that as an instructor it's okay to not know everything or every answer, because sometimes the way that a student's face looks when they can teach you something is priceless and was worth my own humility." Finally, those that participated in the Timber Lane Tales project felt positive about their interactions with children. For instance, one preservice candidate wrote: "I felt that I was able to connect with the students, not all of them all of the time, but generally I could relate to them and they to me."

Learned about Teaching: In response to the question – what did you learn about teaching, the preservice candidates who completed the field experience once again did not make expansive comments. Classroom management seemed of concern to many of them. One student wrote: "Lesson Plans and Technology cannot make up for attention that is lost due to lack of classroom control." Another stated: "The one teacher I observed who best used technology as a tool was a woman who had a strong, commanding personality which resulted in good classroom management." One student who observed students working with graphing calculators wrote: "During the 1 hour and 40 minute period the students spent doing the lab, the teacher spent about 10 minutes at the beginning visiting with each group to record the scores from their homework assignment in her grading book. She spent the rest of the time at her desk like a mother hen watching her chicks busy at work. On occasion someone would come up and ask a question. . . . She was the only teacher with whom I worked that didn't seem frazzled and exhausted at the end of the day." Another student who observed an ESL teacher wrote: "Class size makes all of the difference in the world. It is possible for students to get so much more attention in the smaller classes."

In contrast to those who completed the field experience, those who participated in the Timber Lane Tales project reported learning many things. One student wrote: "I learned that the student-teacher relationship is important, and that students will generally try to please the teacher when they feel that the teacher cares about them." Many of their comments expressed that they had learned much about the need for flexibility in teaching. For example, one preservice candidate stated: "I learned that teaching is not linear, but changes with every student. . . . you must be sure to keep lots of ideas on the back burner to use when things just don't work out and creative changes have to be made." Another wrote: "I learned that a teacher must be flexible and make modifications and accommodations when necessary, even right in the middle of things." In addition to comments about flexibility, those involved in the Timber Lane Tales recognized the importance of planning. For example, one preservice candidate reflected: "I think planning is one of the most important tools in teaching. . . . I think it is harder than it looks if you want to be good. You don't see all the preparation work involved in the lesson." Another wrote: "I learned that teaching takes a great among of preparation outside of class time, but that it pays off by making the class time more

productive." A third theme that emerged from their comments center around the recognition of varied learning needs among the students. One preservice candidate wrote: "I learned that every student has different levels of ability and a teacher needs to accommodate and teach to each one." A second preservice candidate stated: "I saw that kids do have different needs and sometimes just being flexible is all you need to solve the student's problem." A third preservice candidate reflected: "I learned that there is a wide variance in reading ability among the students and that the lack of reading ability is a handicap in a student's non-reading development. I observed a variety of learning styles and intelligences among the students and learned more about the need to recognize and teach to those styles for individual students."

Learned about Young Learners and the Learning/Thinking Process: The third question asked for reflections about what the preservice candidates' had learned about young learners and the learning/thinking process. Consistent with previous questions those who had completed the field experience provide only a few reflections. One student omitted the third question, responding only to the other three questions. One student wrote: "I learned that confidence, or lack thereof, is everything." Another stated: "Students seemed eager to learn and share when presented with opportunities which challenged and respected them. Their learning process shut down, or failed, whenever they were given work that did not do these things." A third reflected: "It seemed to me that these students were at the primary age of learning. This is the stage of life they will be taking in the greatest amount of new information in the smallest amount of time."

No trends were evident in the responses of the preservice candidates' who participated in the Timber Lane Tales project, but a number of interesting insights emerged. One preservice candidate wrote: "I really took notice of the ways in which young learners can be really bold when trying out new things." Another stated: "I learned that most of the student had not developed a logical cognitive thought process . . . . At the same time, it was possible to teach them, through example or asking questions, how to approach solving a problem." A third preservice candidate reflected: "The students enjoyed succeeding. The detective activities were successful because they asked the students to think and not to just learn (or memorize) something. But, of course, by getting them to think in the context of the activity, the learning naturally followed." One preservice candidate wrote: "The most frustrating situation I saw was the different rate of learning and trying to keep everyone involved and interested. I think it was imperative to keep them moving and doing all the different kinds of activities so they did not have a chance to get bored. At the same time some of them needed prodding, others seemed to love a challenge." Finally, one student wrote: "The kids at Timber Lane might think of themselves as young learners, but as I am building my own philosophy of education and filling my mental toolbox with teaching gadgets, the young learners at Timber Lane became young teachers to me."

Learned about Technology in Educational Settings: Differences in the two experiences were reflected most dramatically on the last question – what did you learn about technology in educational settings. The reflections of those who participated in the field experiences are best illustrated by the following three quotations. First, "I learned that you must start with elements such as pointing, clicking, and dragging with the mouse. I learned about some programs for the teaching of ESL which allow for the differentiation of instruction, voice recognition, and the saving of tests." Second, "Technology in educational settings is neither good nor bad. Computers certainly helped in the creation of a school newspaper, but as to whether or not they enhanced the learning or creativity of students is somewhat questionable." Third, "The primary thing I learned about teaching and using technology is that it will likely make my teaching job harder. I base this assessment on the following observations: 1.) Most teachers oppose the use of technology in the classroom; 2.) Teachers who use technology have a high price to pay in terms of their time and energy commitments; and 3.) The teachers I observed who, in essence, were nibbling at the edges of technology utilization had to devote a significant amount of time to their preparation for the technology they were using.

The reflections about technology in educational settings written by those who participated in the Timber Lane Tales project were much more positive. One preservice candidate wrote: "The use of computer technology was an attraction to the students and helped in drawing their interest to the lesson. The effective use of technology to aid problem-solving was dependent on the student's underlying reading and cognitive abilities. Technology can help teach these skills but cannot substitute for them." Another student stated: "Technology can be used within a lesson or content area without taking a lot of time to teach students how to use the technology. I think teachers should lean toward less technology instruction and more toward content area learning with technology as a tool that you become more and more proficient with over time." A third preservice candidate reflected: "Even though I worked with different programs in

different settings, I almost forgot that we were integrating technology into the lessons. I learned that technology can enhance the problem-solving process and bring lessons to life for students. In these moments learning and problem solving become animated. Technology and computers give students a way to take a bit of control over their own learning."

Lessons Learned from Timber Lane Tales

Clearly, this study is preliminary and exploratory. Yet, the contrast between the reflections of those who participated in the field experience and those who participated in the Timber Lane Tales project calls into question the efficacy of more traditional field experiences. Preservice candidates who merely observed classrooms recommended by contacts in the field did not provide opportunities for these candidates to observe the potentials of technology. Neither did these experiences assist students in formulating a vision of how technology integration can support the teaching/learning process. The reflections of those preservice candidates who participated in field experiences suggest that they are not sophisticated enough to distinguish good practices from questionable practices. They are not skilled enough to understand their potential role as an educational leader and reformer, capable of bringing new practices into schools. The ways in which they saw technology being used spoke more loudly than their university classroom experience. As one of the preservice candidates who completed the field experience wrote: "I learned that there is a wide disparity between much of the course materials and teaching approaches in EDIT 504 and anything I will likely use in my classroom." The field experience observations did not meet the intent of the assignment – to provide learning experiences that bridged theory and practice. More traditional field experiences may, in fact, be counterproductive.

Conversely, the reflections of those who participated in the Timber Lane Tales project suggest that their experiences actively teaching with technology as an integrated part of the teaching/learning process assisted them in developing an image of how technology can be used. Their experiences seem to have provided these preservice candidates with a vision of how their course work (theory) can translate to the design of learning opportunities for students (practice). The reflections of these preservice candidates suggest that rather than observing classroom practice, actively teaching with others who are using models of effective technology integration is more likely to promote a sense of innovation and possibility. As one student wrote: "As for me, I was glad to be a part of it, and I think I gained more experience than if I had just been in the classroom as a student." In addition to supporting bridges between theory and practice, the more active involvement of the Timber Lane preservice candidates helped the candidates build a sense of personal efficacy. They developed confidence in their ability to teach students, to use technology in their teaching, and to adapt to the contingencies of classroom teaching. As one preservice candidate wrote: "Most importantly, I learned that deep within myself I really believe that I might be a teacher someday."

One might be tempted at this point to suggest abandoning field experience requirements. However, the intent of field experiences – bridging theory and practice – is a necessary component of teacher education. Projects like Timber Lane Tales offer alternatives. Yet, educational faculties do not have the resources to provide such opportunities to all preservice candidates. Perhaps a viable alternative is to build systematic relationships with graduate programs. Inservice teachers might be aided, as part of their own program of study, to develop units similar to the Timber Lane Tales project with specific target dates for field testing. Preservice candidates would then be assigned to complete field experience requirements in those classrooms, collaborating with the graduate inservice teacher. The additional resources would provide graduate teachers with the support they need to innovate in their own classrooms as well as providing field experience opportunities that are more appropriate for preservice candidates. The dyad of faculty and preservice candidate could become the even more robust triad of faculty, inservice teacher, and preservice candidate, dispelling the us/them dichotomy. As one student wrote: "I enjoyed interacting with the students and other teachers and left with positive thoughts and some funny stories to share with my family each day."

References

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